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Essay

on

Animal Heat.

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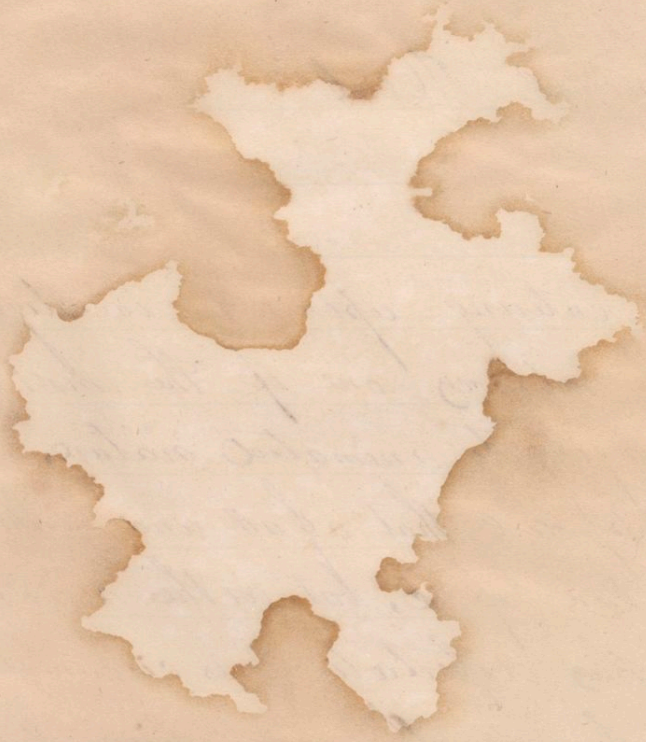
On

Animal Heat

In entering upon the investigation of a subject which embraces one of the most important requisites belonging to animated nature, it perhaps might be supposed that a full and elaborate view would be taken of it, but as the narrow limits to which this dissertation is circumscribed will not admit of a lengthy discussion, I will content myself with offering a few remarks on the cause which appears the most probable in producing animal heat. It is the influence of this powerful agent acting on our systems which gives us vitality imparts vigour, and invigorates the system when exhausted by whatever cause. In a word it acts



as the mainspring to our bodies.

I shall before proceeding to the immediate investigation of the subject, take a limited view of the pulmonary circulation, and the appearance of the blood in the lungs. Nature for a very wise and useful purpose, has furnished all animals with lungs, or something equivalent for respiring atmospherical air, to undergo some change, for purposes directly to be mentioned. The blood by the contraction of the heart, is propelled forwards into the pulmonary artery, and through the whole substance of the lungs. After having undergone the necessary change it is again taken up by the pulmonary veins, and carried back to the heart, and from thence to all parts of the body. The blood when returned to the heart by the veins from the different parts of the body, exhibits a dark red colour, inclining to purple. This appearance of the blood is said to depend upon an ascendency of carbon which it contains. In its passage

through the lungs, it is changed from the modena to a bright scarlet. This alteration of the colour of the blood in the lungs, must unquestionably arise from a chemical action which takes place in consequence of the influence of the atmospherical air on its constituent principles, which has been experimentally and satisfactorily proved to be the case. This action or chemical process going on at every inspiration, appears to be one of the principle ways by which the animal is supplied with heat.

Since the important discovery of the phenomena of heat and combustion, to depend upon the agency of the oxygenous portion of the atmosphere, the alteration of the colour of the blood in the lungs has been ascribed to the influence, which this powerful agent has on it. This opinion is now very generally received, and it is the action of oxygen on our systems, which, in my opinion, I believe to be the sole cause of animal

heat. Oxygen acts both internally and externally in imparting heat to the system. I shall first take notice of its internal operation. as the blood circulates through the lungs, it is exposed to the action of the air we breathe, ~~from which~~ from which it is only seperated by the moist membrane of the lungs. through these it attracts both the elements of the atmosphere, but principally the vital part or oxygen, sufficient to saturate it, whilst the remaining portion unites with the superabundant carbon of the blood, flying off in the form of carbonic acid gas. The oxygen not only unites with the constituent parts of the blood, but also enters into combination with the fibres of the expells, thereby imparting heat and exciting them into action, with which they are constantly supplied as fast as it is exhausted. Every part of the body through the medium of circulatory system is constantly furnished with it, as it becomes diminished in quantity, necessary for the support of the system. It is ~~[illegible]~~

therefore through the medium of the lungs, that the animal receives the greater portion of heat. This is not the only internal source by which the animal is supplied with heat. The process of digestion aids in furnishing heat to the system, and as oxygen is supposed to enter into combination with almost all matter, we may very justly conclude, that the quantity of oxygen taken into the system at every meal is by no means inconsiderable. During the process of digestion, the oxygen contained by the aliment is set at liberty, acting thus as a stimulant to the mouths of the absorbents, is taken up by them, and conveyed into the general circulation. At the same time a part is bestowed on the fibrous portion of the stomach and intestines, thereby exciting a sympathetic action, calculated to evolve putting that may be latent in distant parts.

The action or influence of oxygen on the external surface of the body contributes in a very great degree to supply the system with heat.

the skin which is constantly in contact with the atmosphere, decomposes and deprives it of its oxygen. This is afterwards taken up by the cutaneous absorbents, and conveyed into the circulation. It appears that the same kind of process takes place in this instance, as in the lungs. A part of the oxygen unites with the superabundant carbon and flies off in the form of carbonic acid gas. The remainder unites with the blood and is carried into the circulation. If cutaneous absorption is admitted, it must also be admitted, that the oxygenous portion of the atmosphere is taken into the system in this way.— Having stated in a cursory manner what I believe to be the cause of animal heat. I will in the next place state, what appears to me to be the most probable cause in effecting the renovation of excitability.—

The means by which the renovation of excitability is effected, is by the oxygenation of the blood and sympathy. When the muscles of the arm for

instance, are forcibly exerted for some time in grasping some substance with the hand, their excitability becomes exhausted, and we experience such fatigue that the exertion cannot be continued. During a short period of rest, these renovating principles restore the excitable structure, and the action again is renewed, for the renovation thus experienced, after every occurence of excitement, is entirely owing to the renovating powers of oxygen & sympathy.

Oxygen thus combined with the blood is the sole cause or principle in renovation. It is the sine qua non of excitability and the radical supporter of the whole excitable structure — Sympathy is chiefly useful in extending the action calculated to set at liberty the latent oxygen contained in other parts and thereby repairing the injuries of its subordinate parts, for instance, when the excitability of any organ of sense or muscle is exhausted by stimulation, it is sympathy with

the whole system which so speedily restores it to its primative perfection, whilst that structure in its whole extent is radically dependant on the application of oxygen. —

By the influence of sympathy, the excitability of subordinate parts, may be supported and its exhaustion repaired, but the principle of oxygen in the blood is the source from which it radically springs, without the preservative influence of this principle, the whole excitable structure is subverted in a moment and we cease to live.

The oxygen taken into the system in all the ways mentioned, is extended to every portion of it through the medium of the circulation and sympathy. The modus operandi of oxygen in producing the effects which I have attributed to it, is not well understood, but I lean to the opinion that it chemically combines with the fibre. — From what has been said, it appears that we are supplied with heat, through the medium of the lungs, digestion, and the cutaneous absorption of oxygen. — — —